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THE DIFFERENCES IN WATER QUALITY PARAMETER OF TREATED & UNTREATED WATER IN GETALSUD DAM, RUKKA, JHARKHAND

SYNOPSIS

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for the degree of
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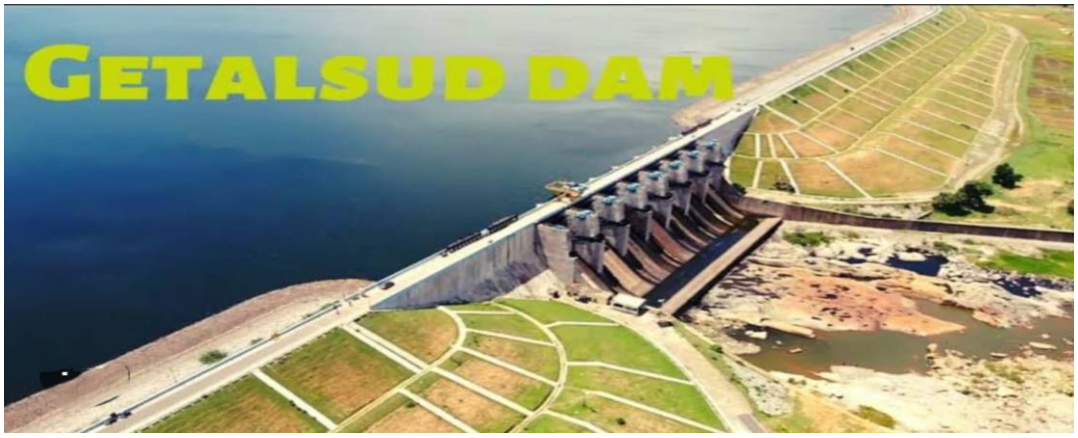

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1. INTRODUCTION:

Water has its own importance serve as a lifeline to human, plants and animals. Water must be safe for drinking with less and no impurities called potable water, stand with health issues. Half a century ago, most of the rivers in India were biologically in good condition, amply met the water needs of the populations and also supported diverse fish and flora species (World Bank 1998: 8). The National Water Policy (India) in 1987 was framed to report problems about planning, development and allocating groundwater and surface water India. It serves as a guideline in conservation and planning of water resources. At the dawning of a new millennium, at least one-fifth of all people worldwide lack access to safe drinking water, according to a 1999 United Nations (UN) comprehensive assessment of world water resources, and more than one-half of all people lack access to adequate sanitation {Tibbets2000}. If current trends continue, billions of people will lack access to safely managed drinking water services by 2030, making it difficult to meet Standards for sustainable Development Goal 6. According to WHO & UNICEF joint monitoring program report and it data also indicates that about 6% of India's population, which translates to roughly 80 million people, still lack access to at least basic drinking water services. By 2030, global demand for fresh water will exceed supply by 40%, leading to severe shortages in many regions according to Global Water Security Report by the U.S. National Intelligence Council.

The concept of water as a natural resource, which must be carefully managed is very important as growing populations and industrial developments demand ever-increasing supplies of water (Tebbutt, 1993). Water relates directly with the nutritional status of individual due to its important functions in the body. Human body requires minerals for its metabolism and water is a source of these minerals such as sodium, calcium and zinc (Pontius, 1994). Water quality is therefore an important aspect to observe as the majority of population in developing countries is affected by water-related diseases. Recent estimates suggest that 5-10% of deaths in these countries are due to water related diseases (Hammer & Hammer, 2003). Water quality refers to all attributes of water, which make it acceptable to the people {Shayo2007}. In certain cases chemicals in water may be potential causes of diseases (Hammer & Hammer, 2003). Water derived from different sources may greatly differ in quality. Rainwater collects impurities while passing through the air, while stream and rivers collect impurities from surface run off. The complete valuations of water quality achieved through chemical analysis, biological test and physical measurements. Water necessary for public water supply schemes should be drinkable. The presence of some materials is very essential in food assimilation and for good test. The overall purification of water is time taking and costly. Therefore, impurities in water must be removed with certain extent to make it beneficial for human health. The construction, operation, supervision of water supply reservoirs and distribution system should exclude any possible pollution of the water (TBS, 1997).

2. STATE OF THE ART:

Getalsud Dam is an artificial reservoir situated in Ormanjhi, Ranchi, Jharkhand. It was constructed across the Subarnarekha River and was opened in 1971. It is a popular picnic spot for the residents of Ranchi and Ramgarh District. The dam provides a small-scale fishing opportunity to the local people of Rukka. The main purpose of the dam is to fulfill the drinking water requirements of the residents of Ranchi. Apart from that, it is used for industrial purposes and generating electricity.
Jharkhand's capital city Ranchi is reportedly battling a severe water crisis after the supply from the Rukka Dam to more than 25 wards of the city was disrupted.the Rukka Dam is said to be the primary source of drinking water to above 55 localities in 25 wards, supplying around 30-35 million gallons daily. Among the localities dependent on the dam are the RIMS complex, Morabadi, Karamtoli, Lalpur, Kantatoli, Kokar, Tharpakhna, Upper Bazaar and Nivaranpur, with roughly seven lakh people.At least four rivers - Harmu, Saphi, Potpota and Subernarekha - flow into Rukka dam (also known as Getalsud). According to officials at the filtration plant in Rukka, a few rice and paper mills, industrial units such as Usha Martin and other ancillary units operate along the banks.

The Booty water supply system, having a treatment capacity of 170.48 MLD was commissioned in 1971, which is still operational and newly constructed water treatment plant,having a treatment capacity of 114 MLD which was commissioned in 2018 with water source fromthe Rukka reservoir on Subarnarekha River, 12.5km north of Ranchi City. The reservoir was constructed for dual purpose, namely for water supply to Ranchi City and for generation of hydropower. After Booty water supply system was set up, the existing Gonda and Hatia systemswere connected to Booty system to provide flexibility to transfer and supply water to Ranchi City.

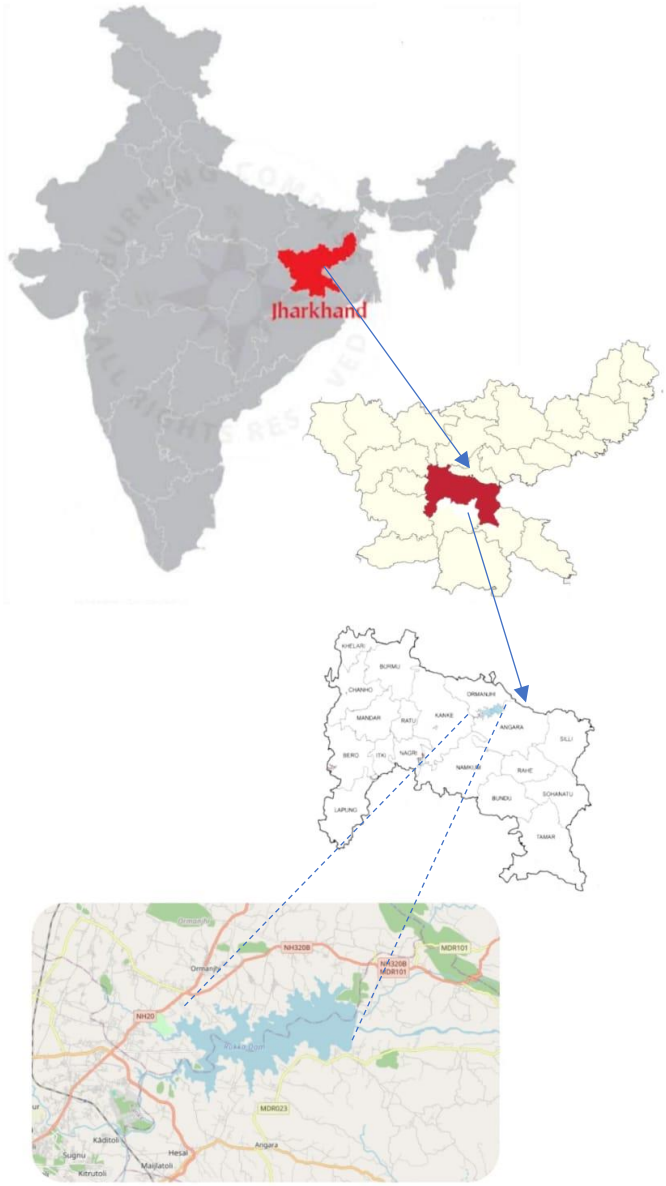
3. TOPOGRAPHY:

The area is located on Survey of India Topo-sheet No. 73E/7 & 73E/11, having latitude 23°27′24"N and longitude 85°33′19"E. The catchment area about 717^2 km (277^2 mi) across Subarnarekha river in Ormanjhi of Ranchi district, Jharkhand ,India

Topo-sheet No. 73E/7 & 73E/11

4. LOCATION AND ACCESIBILITY:

The dam is located on the north-eastern edge of Chota Nagpur Plateau. It is situated in Rukka Block, because of which it is locally known as Rukka Dam. The Getalsud Dam is around 35 km from Ranchi and around 30 km from Ramgarh



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5. OBJECTIVE OF THE INVESTIGATION AND MOTIVATION:

Water Quality monitoring is very essential now-a-days to ensure the safety of drinking water. We will check the different water quality parameters of the water from two sources, one from supply water and second will from Dam water. The study site will be Getalsud Dam, Jharkhand India. In the present study we will report the physicochemical properties like pH, conductivity, turbidity, alkalinity (methyl orange), Silicate, chloride, D.O., carbon dioxide (free CO_2), total alkalinity, TDS, BOD, COD and Hardness based on laboratical work and onsite measurements like chemical preparation and physical analysis of water to get accurate results as value of parameters changes apparently over time or by mixing of impurities from air. Lastly, the study will conclude whether the supply water is fit for drinking and check if dam water stands with the water quality standards by Indian Bureau.

Therefore, the Present study aims at to check the condition of dam water and supply water as to ensure the safety for drinking and to check its purity. Hence, the work is planned in the site of Getalsud Dam, Ranchi, Jharkhand (India) to investigate or assess the existing quality of Dam water (untreated) and supply water (treated) and also to check the working of associated WTP (water treatments plant) near dam.

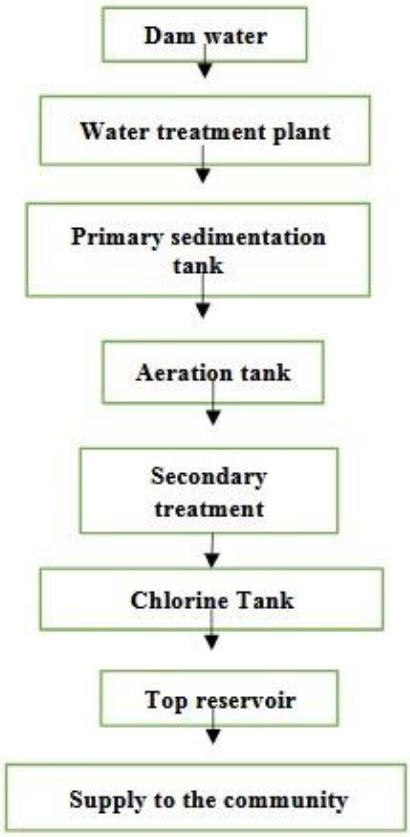

Fig.1 Water Treatment Plant to purify Dam water

6. RESEARCH DESIGN AND METHODOLOGY:

The overall methodology in simple way is demonstrated in Fig.2 and its details are given below analysis will be carried out in laboratory and on site measurement according to methods recommended by APHA, 2005.

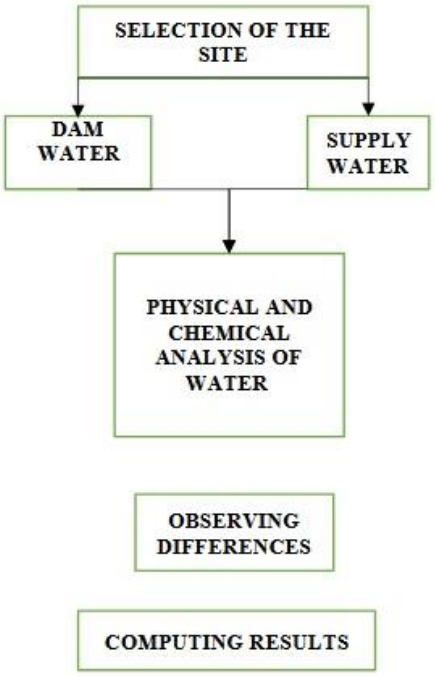

Fig 2. Methodology

7. SAMPLING PROCEDURE :

Water samples will be collected for two consecutive months from the two sampling sites of Getalsud dam, one from dam and other one from supply water i.e. WTP from public taps. Both water samples will be taken in pre- cleaned sterile bottles as described by Harrigan & McCance (1976). The samples will be analysed in the laboratory. The analysis will be done in two consecutive months and for which samples will be collected.

8. TOOLS TO BE USED IN THE COLLECTION OF DATA:

A sampling bottle: for collecting sample from the dam water.
The Secchi Disk: to measure the turbidity of dam water and supply water.
A Digital pH meter: for determination of pH of water.
A conductivity meter: for measuring conductivity of water.
Spectro-photometer: for calculating absorbance of some parameters to determine its value like silicate at absorbance of 700 nm.

9. SIGNIFICANCE OF THE WORK, ITS RELEVANCE TO THE PRESENT-DAY PROBLEM AND NEED OF THE SOCIETY:

Clean water is a basic necessity for humans. While the human population grows, the demand for water grows as well. Since water is a finite resource, water must be treated before serve end-uses. Water treatment plants play a vital role in distributing safe drinking water, water treatment helps in removing contaminants and hazardous substances from the water, making it clean and safe to drink and be used for other purposes but without proper maintenance, these plants can become a breeding ground for harmful bacteria and viruses. Unfortunately, almost 2 billion people in the world use either untreated drinking water or get water from unsafe or contaminated sources. Proper maintenance of such a treatment plant may lead to improve water quality and prevent unsafe water-caused incidents, such as water-borne diseases and fatalities. The importance of water treatment plant maintenance can be overstated. Regular maintenance not only helps ensure the safety of the water supply but also helps extend the life of the plant itself.

10. CONTRIBUTION TO THE EXISTING KNOWLEDGE, FUTURE WORK:

The physio chemical parameter of Dam Water will be compared with Bureau of Indian Standards (BIS). On monitoring water quality parameter on treated and untreated water will provide us a clear picture whether treatment plant is working properly or it need to undergo maintenance to improve its performance which will prevent future breakdowns leading to cost savings and improved water quality.

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